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PHYSICIAN PRACTICE VARIATIONS (AREA 4)
FINAL REPORT
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I. INTRODUCTION AND BACKGROUND

Preliminary projections from the Department of Health and Human Services indicate that the supply of active (M.D.) physicians will increase from about 400,000 at the end of 1979 to more than 560,000 in 1990.[1] That increase in physician stock will be associated with a parallel growth in service activity and expenditures for physician services. It will follow on the heels of a growth of almost 100,000 physicians from 1970 through 1979. Prior to the introduction of our analyses, we will review data from other sources which portray the major trends in physician activity during all or part of the period from 1970 through 1979.

The Decade of the 70s

The underlying factor in the change in aggregate activity is the increase in the number of active physicians and their changing characteristics. At the beginning of 1970 there were almost 303,000 active M.D. physicians, while at the end of 1979 there were almost 400,000 active M.D. physicians.[2] In the former year more than 90 percent of the physicians were primarily involved with patient care. That had declined to 85 percent in 1979. About 73 percent of the patient care physicians were primarily in office-based practice both at the beginning and end of the decade.

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[1] U.S. Department of Health and Human Services, The Current and Future Supply of Physicians and Physician Specialists (1980).

[2] The data on physician stock have been taken from various editions of the American Medical Association publications, Physician Distribution and Medical Licensure in the U.S.

During the decade the major shifts in the distribution of physicians among specialties were the substantial proportionate decline in the general practice category, the relative increase in general internal medicine, and a substantial proportionate increase in the "other specialty" category for office-based practice. The latter includes anesthesiologists, radiologists, and pathologists. Geographically, there was a relative shifting of physicians from the Northeast to the South with a slight proportionate increase in the West.

Female physicians were estimated to represent 6.7 percent of the total supply in 1970 and 10.6 percent in 1980. Females made up 9 percent of M.D. first-year enrollment for 1969-70, but had increased to 27.8 percent of enrollment in 1979-80. By comparing specialty distribution by age, Wunderman has concluded that women physicians are moving in especially great proportions into the specialties of internal medicine and pediatrics, and to a lesser extent into pathology and general surgery.[1] Declines were especially apparent in general practice, psychiatry, and public health.

The National Ambulatory Medical Care Survey (NAMCS), inaugurated in 1973, suggests that the aggregate number of visits to physicians' offices remained relatively constant through 1979 and perhaps even declined slightly.[2] The NAMCS estimates ranged from 591 million in the first year to 556 million in 1979. On a per capita basis there was a decline from 3.1 visits to 2.6 visits per year.

Whereas it was estimated that 42 percent of office visits were to general and family practice in 1973, that percentage had declined to 34 percent in 1979.

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[1] Lorna E. Wunderman, "Female Physicians in the 1970s: Their Changing Role in Medicine," in Profile of Medical Practice 1980, American Medical Association, pp. 51-66.

[2] Thomas McLemore, 1979 Summary National Ambulatory Medical Care Survey, NCHS Advancedata, No. 66 (March 2, 1981).

Table 1
Distribution of Physicians by Specialty, 1970 and 1979

	1970		1979	
	Patient Care	Office-Based	Patient Care	Office-Based
General Practice	21%	27%	16%	19%
General Internal Med.	13	12	17	14
Pediatrics	6	5	7	6
Ob-Gyn.	7	7	7	7
Medical Specialties	5	6	5	6
General Surgery	10	10	9	9
Surgical Specialties	13	14	13	15
Psychiatry	6	5	7	6
Other Specialties	19	14	19	18

Source: 1970 Data of J. M. Haug, G.A. Roback, B.C. Martin, Distribution of Physicians in the United Sates, 1970, American Medical Association (1971); 1979 Data — Lorna E. Wunderman, Physician Distribution and Medical Licenses in the U.S., 1979, American Medical Association (1980).

The proportion of office visits associated with pediatrics increased from 7 percent to 10 percent while surgical specialties increased from 28.5 percent to above 31 percent.

The aggregate number of physician visits (excluding hospital contacts) did increase from 1970 through 1979 according to data collected from the Health Interview Survey. That increase was from about 850 million to 1 billion visits with a per person increase from 4.3 visits to 4.8 visits.[1]

Data collected by the American Medical Association on physician practice patterns would suggest that total patient contacts of office-based physicians increased from about 1.2 billion in 1970 to about 1.45 billion in 1979.[2] There was a slight decline in the average number of patient contacts per week from 1970 through 1979. This decline was smaller than might be expected given the shift away from general practice where the weekly contacts are about 30 percent greater than for the overall average; the increase in the proportion of women physicians whose weekly patient contacts have been about 33 percent less than males; and an increase in the office-based physician population ratio from 93 per 100,000 to 113 per 100,000. On a per person basis the activity figures would suggest a movement from 5.5 annual visits to 6.6 annual visits.

Aggregate increases in expenditure for physician services have been estimated to have increased from $14.3 billion in 1970 to $40.6 billion in 1979.[3] That translates into movements from about $70 per person in 1970 to $185 per person in 1979, and from about $56,000 per patient care physician in 1970 to $118,000 per patient care physician in 1979. That would suggest an increase in average gross income for physicians of about 8.5 percent per year which is somewhat greater than the 6.7 percent estimated from net income and expense data by the AMA.[1] The latter has estimated an increase in net income from $41,800 to $68,600 or 5.7 percent per year while professional expenses increased at 8.3 percent per year, and the all items component of the Consumer Price Index increased at 7.2 percent per year.

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[1] National Center for Health Statistics, Current Estimates from the Health Interview Survey, (United States, 1979) and Current Estimates from the Health Interview Survey (United States, 1970).

[2] American Medical Association, Profile of Medical Practice 1980.

[3] Robert Gibson, "National Health Expeditures, 1979," Health Care Financing Review (Summer 1980).

The Teknekron Analysis

There were several objectives for the Task 4 analyses undertaken by Teknekron Research, Inc. of the 1977 HCFA Physician Survey data. Primarily we were interested in estimating aggregate office-based physician activity and revenue for 1977 and then projecting that activity and revenue for the year 1990. In this report we will discuss the underlying tendencies or pressures which can be projected based on the activity proclivities suggested in the 1977 HCFA Physician Survey. This is preliminary work which will be continued and expanded during the third year of our contract.

The projections which are made can provide a base for consideration of alternative policies which might affect the allocation of the physician resources which will be available. The capacity will exist to provide millions of hours additional physician services and many millions more patient contacts than exist today. Financing mechanisms and other policies affecting physician behavior (including location) should be developed with the goal in mind of allocating that incremental activity in a socially optimal manner.

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[1] American Medical Association, Profile of Medical Practice 1980.

The exact nature of the impact of rapid growth in the physician stock will depend on physician characteristics, patient characteristics, and behavioral responses of physicians to changing market conditions as well as the insitutional environment generated by government and private organization policies. Therefore, we also have carried out wide-ranging research in order to better describe and analyze practice characteristics of physicians as related to:

- Demographic characteristics and economic status of the physicians,
- Demographic characteristics and economic condition of the geographic area,
- Demographic characteristics and economic status of patients served.

Practice variables of interest included:

1. Weeks worked
2. Hours worked
3. Patient contacts
4. Site of patient contact
5. Office visits per hour
6. Fees
7. Gross income
8. Net income
9. Net income per hour.

The Sample

The analyses presented in this report have used the sample data for office-based physicians from the 1977 HCFA Survey. There were a total of 4,742 respondents in the 15 specialty classifications as portrayed in Table 2. For most of our analyses, those specialties were combined into the eight groups listed below:

Table 2
Specialty Sample Size

Specialty	Number of Respondents
Allergy	135
Cardiovascular Disease	120
Dermatology	144
Gastroenterology	92
General/Family Practice	663
General Surgery	526
Internal Medicine	498
Neurological Surgery	123
Obstetrics/Gynecology	620
Ophthalmology	197
Orthopedic Surgery	180
Otolaryngology	178
Pediatrics/Pediatric Surgery	546
Psychiatry/Child Psychiatry	568
Urology	152
Total	4,742

1. General and Family Practice
2. General Internal Medicine
3. General Pediatrics
4. General Survery, Neurosurgery, and Orthopedic Surgery (SURG)
5. Obstetrics and Gynecology (OB-GYN)
6. Dermatology, Allergy, Cardiovascular Diseases, Gastroenterology (MED-SPEC)
7 Ophthalmology, Otolaryngology, Urology (SURG-SPEC)
8. Psychiatry

The number of cases in each group are listed in Table 3. All groups had substantial representation although there was a range from 17.5 percent of the total in the Surgery group to 10.4 percent for each of the two Internal Medicine categories. Only 196 female physician respondents were available for analysis.

The findings we present here have used the weights developed by NORC to compensate both for the differential probability of selection in the initial design and later subsampling as well as differential cooperation rates within the stratum. The weighted total for the specialties studied was about 25 times that of the actual count — 117,294. As indicated in Table 4, each physician in the General Practice group represented 47 physicians in the underlying population, while each physician in the Pediatric group represented 14 physicians.

Table 3
Subfile Size by Specialty Group and Sex

Sex/Specialty	Number of Respondents
Males	
General/Family Practice	640
Internal Medicine	487
Pediatrics/Pediatric Surgery	487
General Surgery, Neurosurgery, & Orthopedic Surgery	825
Obstetrics/Gynecology	591
Dermatology, Allergy, Cardiovascular Diseases, Gastroenterology	477
Ophthalmology, Otolaryngology, Urology	518
Psychiatry	521
Total	4,546
Females	
General/Family Practice	23
Internal Medicine	11
Pediatrics/Pediatric Surgery	59
General Surgery, Neurosurgery, & Orthopedic Surgery	4
Obstetrics/Gynecology	29
Dermatology, Allergy, Cardiovascular Diseases, Gastroenterology	14
Ophthalmology, Otolaryngology, Urology	9
Psychiatry	47
Total	196

Table 4
Distribution Among Eight Specialty Groups
(Weighted Sample)

Group	Weighted Number	Percentage of Weighted Total	Ratio of Weighted Number to Actual Sample
General Practice	31,008	26	47
Internal Medicine	16,960	14	34
Pediatrics	7,788	7	14
Surgery	20,040	17	24
Ob-Gyn	11,332	10	18
Med-Spec	7,614	6	16
Surg-Spec	13,749	12	26
Psychiatry	8,801	8	15
Total	117,292	100.0	25

II. PROJECTIONS OF PHYSICIAN ACTIVITY AND INCOME

The Baseline

Our estimates of aggregate annual activity rates were made using the weighted means for selected activity categories from the HCFA survey, actual AMA counts of office-based physicians in 1977, and HRA projections of active M.D. physicians in 1990. The latter were multiplied by specialty-specific ratios of office-based physicians to active physicians in 1977 in order to estimate the stock of office-based physicians in 1990.

A 59 percent increase in office-based physicians was projected for the specialties under consideration. The underlying means of activity for each group used in our estimates are shown in Table 5. Our estimates for 1977 suggest that there were slightly more than 1.3 billion patient contacts with the physician specialties under review. This is almost the same as the number projected for 1976. About 340 million of these contacts were identified as hospital in-patient visits. On a per capita basis, our estimates come to 6.2 patient contacts and 4.0 office visits for 1977.

Almost 46 percent of the 114,000 increase in office-based physicians will occur in General Practice and General Internal Medicine. Assuming the average values for service activity remains the same in 1990 as in 1977, those additional primary care physicians would provide:

a. 125 million additional patient contact hours
b. 399 million additional patient contacts (1.6 contacts per person)
c. 77 million additional office visit hours
d. 256 million additional office visits (1.0 visits per person)
e. 30 million additional hours on hospital rounds and surgical activities
f. 99 million additional hospital in-patient visits (.4 visits per person)

Table 5
Physician Activity Proclivities, 1977
(Weighted Means of Weekly Values)

Specialty Groups	Patient Contact Hours	Total Patient Contacts	Total Office Hours	Total Office Contacts	Office Contacts/ Office Hours	Total Hours on Hospital Rounds	Total Hospital Inpatient Visits	Total Hours on Operations and Surg. Assists
General Practice	51.2	186.7	32.9	130.3	4.2	9.8	36.9	2.1
Internal Medicine	48.4	131.8	28.8	73.5	2.8	14.5	42.8	—
Pediatrics	48.0	166.0	35.3	128.6	3.9	9.2	26.5	—
Surgery	51.7	148.0	18.6	68.4	4.0	13.9	60.2	14.6
Ob-Gyn	52.2	151.7	27.5	99.6	4.0	9.3	36.9	10.4
Med-Spec	43.5	143.6	29.0	103.1	3.8	9.9	28.1	5.6
Surg-Spec	45.0	132.9	27.8	92.0	3.7	6.9	26.5	7.1
Psychiatry	40.4	49.8	33.1	35.9	1.1	9.2	10.2	—

The substantial estimated increments in aggregate physician activity will be provided to a population which will have increased by only 27 million persons during the 13-year period.

The greatest percentage rate of growth has been projected for Medical Specialties (117%) and Pediatrics (106%). The increases in the availability of Medical Specialist services listed below will be accompanied by a 15 percent increase in the adult (18 years and over) population and an even more rapid increase of 27 percent in the older age groups (over 65 years).

a. 35 million additional patient contact hours
b. 114 million additional patient contacts (.45 contacts per person)
c. 23 million additional office hours
d. 82 million additional office visits (.32 visits per person)
e. 8 million additional hours on hospital rounds and surgical activities
f. 22 million additional in-patient hospital visits (.09 visits per person)

Since the population under 14 years of age is expected to only increase by about 10 percent or 5 million persons between 1977 and 1990, the following base projections for Pediatric activity certainly raise real allocation questions and opportunities.

a. 34 million additional patient contact hours
b. 119 million additional patient contacts (1.9 contacts per person)
c. 25 million additional office hours
d. 109 million additional office visits (1.7 contacts per child)
e. 6 million additional hours on hospital rounds
f. 19 million additional in-patient hospital visits (.3 contacts per child)

It appears that the Surgery and Surgery Specialty groups will have the least rapid growth in activity. Nevertheless, at 1977 activity rates, there would be an increment of 7.6 million hours on operations and surgical assists. Moreover, the additional surgical manpower would undertake 29.8 million in-patient hospital visits. Ob.-Gyn. specialists, also frequently considered a surgical specialty, would provide an additional 57 million patient contacts during 20 million additional patient contact hours, although the number of females of childbearing age will remain relatively constant. Finally, Psychiatrists are projected to provide an additional 14 million patient contacts during an expanded 12 million patient contact hours.

The summary table following presents some additional estimates used in the projections along with the totals on which the previous discussion was based. Our baseline projections suggest that there will be a 60 percent aggregate increase in physician-patient contacts between 1977 and 1990 for the specialty groups studied. That increase of 800 million contacts (3.3 per person) would include 534 million additional office visits (2.2 per person) and 186 million additional hospital inpatient visits (.76 per person).

Income

We estimate that the 195,000 office-based physicians in the specialties under study received $22.7 billion gross income in 1977 and $11.7 billion in net income. If the absolute level of mean income remained the same, by specialty, the 1990 values would be $35.6 billion and $18.4 billion entirely due to the increase in the number of physicians. However, assuming a growth in mean income at 5.5 percent per annum which is estimated to have been the rate of growth in mean physician net income from 1970 to 1978[1], the 1990 values would be $75.3 billion and $38.9 billion for gross income and net income respectively. That would represent a 231 percent increase in each of those income measures over just a 13-year period, an annual rate of about nine percent per year. Almost 50 percent of the increase would still be associated with the increment in physicians. The data underlying our projections are presented in Table 7.

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[1] American Medical Association, John C. Gaffney and Gerald L. Glandon, eds., Profile of Medical Practice 1979, p. 260.

Table 6
Summary of Projection of Aggregate Physician Activity, 1990

Specialty Group	Office-Based Physicians	%Office-Based of Total Active Physicians	Mean Number Weeks Worked	Patient Contact Hours*	Office Hours*	Total Patient Contact*	Number Office Visits*	Hours on Hospital Rounds*	Hospital Inpatient Visits*	Hours on Operations and Surgical Assists*
[1977]					*(Annual values in millions)					
General Practice	45,351	82	47.7	110.8	71.2	403.9	281.9	21.2	79.8	4.5
Internal Medicine	31,773	51	47.4	72.9	43.4	198.5	110.7	21.8	64.5	—
Pediatrics	14,295	61	47.0	32.3	23.7	111.6	86.4	6.2	17.8	—
Surgery	32,269	68	46.8	78.1	28.1	223.5	103.3	21.0	90.9	22.0
Ob-Gyn	17,297	74	46.9	42.3	22.3	123.1	80.8	7.5	29.9	8.4
Med-Spec	14,338	73	47.1	29.4	19.6	97.0	69.6	6.7	19.0	3.8
Surg-Spec	23,783	79	46.8	50.1	30.9	147.9	102.4	7.7	29.5	7.9
Psychiatry	15,562	56	47.6	29.9	24.5	36.9	26.6	6.8	7.6	—
Total	194,896			445.8	263.7	1,342.3	861.7	98.9	338.7	46.6
[Projected] [1990]										
General Practice	72,062			176.9	113.1	641.8	447.9	33.7	126.8	7.2
Internal Medicine	57,521			132.0	78.5	359.4	200.4	39.5	116.7	—
Pediatrics	29,567			66.7	49.1	230.7	178.7	12.8	36.8	—
Surgery	39,151			94.7	34.1	271.2	125.3	25.5	110.3	26.8
Ob-Gyn	25,255			61.8	32.6	179.7	118.0	11.0	43.7	12.3
Med-Spec	31,228			64.0	42.7	211.2	151.6	14.6	41.3	8.2
Surg-Spec	32,133			67.7	41.8	199.9	138.4	10.4	39.9	10.7
Psychiatry	21,515			41.4	33.9	51.0	36.8	9.4	10.4	—
Total	308,432			705.2	395.8	2,144.9	1,397.1	156.9	525.9	65.2

Table 7
Projections of Annual Physician Income, 1990

	Weighted Means — 1977		Aggregates					
			Gross Income (in billions)			Net Income (in billions)		
Specialty Group	Gross Income	Net Income	1977	1990	1990 Inflated*	1977	1990	1990 Inflated*
General Practice	$104,419	$ 49,809	$ 4.7	$ 7.5	$15.9	$ 2.3	$ 3.6	$ 7.6
Internal Medicine	109,526	54,929	3.5	6.3	13.3	1.7	3.2	6.8
Pediatrics	92,229	49,814	1.3	2.7	5.7	.7	1.5	3.2
Surgery	140,926	75,780	4.5	5.5	11.6	2.4	3.0	6.3
Ob-Gyn	140,828	68,023	2.4	3.6	7.6	1.2	1.7	3.6
Med-Spec	127,123	67,416	1.8	4.0	8.5	1.0	2.1	4.4
Surg-Spec	132,812	68,342	3.2	4.3	9.1	1.6	2.2	4.7
Psychiatry	80,453	49,702	1.3	1.7	3.6	.8	1.1	2.3
TOTAL			$22.7	$35.6	$75.3	$11.7	$18.4	$38.9

*The inflation rate applied to the 1977 weighted means was 5.5 percent per year.

Possible Adjustments to the Baseline

The previous estimates of physician activity and income growth were made with the assumption that mean activity and income levels (unadjusted for secular trend) remain the same in 1990 as existed in 1977. However, major changes are projected to have occurred by the later year in the characteristics of physicians, patients, and markets. There will be a larger proportion of female physicians; a greater proportion of physicians will be located in areas with the highest ratios of physicians to population; and there will be a greater concentration of the elderly in the practice of physicians.

Assuming that the factors affecting physician activity are independent, their impact can be assessed individually using the equation:

$$(1) \qquad A = \sum_i p_i^1 a_i P^1 - \sum_i p_i^o a_i P^1$$

where A = total activity

p_i^o = the percentage of physicians in the original period in group i of the categorical factor (e.g., physician population ratio)

p_i^1 = the percentage of physicians in the study period in group i of the categorical factors

a_i = the estimated activity level for group i of the categorical factor

P^1 = the total number of physicians in the study period.

Clearly, the critical parameters for analysis are the a_i and p_i. Using the data from the 1977 HCFA survey in cross-section analyses, we will evaluate the relationships between physician activity and income and the relevant area, physician and patient characteristics. We will first present results of cross-tabulations. Then we present multiple regression results which include the variables of special interest along with other variables which might impact on activity and income. Procedures for estimating changes in the p_i will then be introduced and discussed.

Cross-Tabulations

Cross-tabulations were used in order to identify apparent relationships between activities or income-related variables and the physician-population ratio (MD/POP). The results are presented in Table 8 and can be summarized as follows:

why Dade only?

a. There is a clear inverse relationship between total patient visits and the physician population ratio.

b. There is an uneven but overall downward trend in office visits per hour as MD/POP increases.

c. A positive relationship generally exists between the office follow-up fee and MD/POP.

d. The relationship between hourly wage and MD/POP appears to be that of an inverted U in that the peak of the wage appears to be in the mid-range of the physician population distribution.

e. While no definite form of the relationship between annual net income and MD/POP appears, it is clear that physicians in the counties with the greatest MD/POP ratios have incomes at the lower end of that distribution on the average.

The influence of varying proportions of Medicare patients on the activity and income levels of physicians has also been evaluated through cross-tabulations in order to identify suggested relationships. The tabular breakdowns presented in Tables 9 and 10 portray the following relationships:

a. The physicians with the most intense focus on Medicare patients have a substantially greater proportion of their patient contacts occur in the hospital setting.

b. Physicians with a greater focus on Medicare patients spend fewer hours in the office.

Table 8
Physician Activity and Income Related to Physician-Population Ratios (Weighted Means)*

Specialty Group/ M.D./Pop.	Total Patient Visits	Office Visits/ Office Hours	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
General Practice					
Less than 50	239.4	5.1	$ 9.90	$22.78	$ 58,289
50-99	203.8	4.3	10.66	21.27	52,460
100-149	200.2	4.4	12.16	22.22	54,953
150-199	157.4	4.1	13.79	19.30	42,560
200-249	153.1	3.5	14.82	23.71	49,322
250-299	162.9	3.8	14.81	23.78	44,864
300+	166.7	4.0	14.82	19.21	36,521
Internal Medicine					
Less than 50	201.7	3.7	14.72	28.75	67,083
50-99	174.7	3.3	13.29	24.70	54,436
100-149	136.6	2.9	16.06	24.86	55,487
150-199	127.5	2.6	18.78	25.19	56,903
200-249	132.3	2.9	18.40	26.36	59,522
250-299	134.5	2.6	18.58	21.59	51,447
300+	93.1	2.4	19.30	26.47	49,893
Pediatrics					
Less than 50	—	—	—	—	—
50-99	198.6	4.2	11.32	23.18	53,067
100-149	186.7	4.0	12.00	22.93	55,513
150-199	165.7	4.0	13.22	24.06	50,639
200-249	156.6	3.9	13.37	23.98	50,639
250-299	131.4	3.4	14.33	25.10	47,949
300+	154.3	3.5	12.20	25.37	46,758

*Male physicians only

Table 8 (continued)

Specialty Group/ M.D./Pop.	Total Patient Visits	Office Visits/ Office Hours	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
Surgery					
Less than 50	172.4	4.1	11.97	24.23	63,263
50-99	174.2	4.6	13.04	29.10	70,422
100-149	162.7	4.2	14.00	35.24	84,514
150-199	142.9	4.1	14.88	29.22	79,046
200-249	136.4	3.6	17.44	30.76	80,508
250-299	124.4	3.6	18.77	22.73	64,069
300+	123.1	3.2	17.65	28.50	66,155
Ob-Gyn					
Less than 50	—	—	—	—	—
50-99	171.5	4.0	14.83	28.07	70,970
100-149	163.7	4.3	17.05	30.80	72,706
150-199	146.0	3.9	17.42	29.68	68,453
200-249	149.5	3.9	18.78	30.18	73,891
250-299	139.7	3.9	18.88	25.72	54,515
300+	140.1	3.6	22.48	30.70	64,679
Med-Spec					
Less than 50	—	—	—	—	—
50-99	181.3	4.3	14.76	25.79	59,977
100-149	156.9	3.9	15.29	31.36	
65,158					
150-199	153.2	4.1	17.30	35.02	81,018
200-249	142.9	4.1	18.33	36.99	66,289
250-299	127.9	3.2	20.61	29.41	61,962
300+	112.5	2.7	22.27	32.71	63,164

Table 8 (continued)

Specialty Group/ M.D./Pop.	Total Patient Visits	Office Visits/ Office Hours	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
Surg-Spec					
Less than 50	—	—	—	—	—
50-99	144.3	3.8	14.01	32.66	66,049
100-149	140.5	3.7	14.33	30.04	66,127
150-199	136.1	3.8	17.18	35.05	71,417
200-249	135.6	3.8	19.13	35.03	76,267
250-299	123.2	3.6	18.57	33.35	67,235
300+	112.2	3.3	15.92	29.25	55,847
Psychiatry					
Less than 50	—	—	—	—	—
50-99	67.1	1.2	—	26.14	48,333
100-149	65.6	1.3	—	27.81	54,081
150-199	50.4	1.1	—	27.81	53,995
200-249	50.6	1.2	—	29.12	55,248
250-299	46.8	1.1	—	28.16	47,224
300+	41.7	1.0	—	26.30	46,142

Table 9
Physician Activity Related to Medicare Patient Focus, 1977
(Weighted Means)*

Specialty Group/ % Medicare	Patient Contact Hours	Total Patient Contacts	Total Office Hours	Total Office Contacts	Office Contacts/ Office Hours	Total Hours on Hospital Rounds	Total Hospital Inpatient Visits
General Practice							
Less than 10%	52.0	176.6	35.0	134.6	4.1	9.8	28.6
10-24%	51.7	188.8	33.4	136.0	4.4	9.7	32.5
25-49%	51.4	202.1	33.1	137.7	4.5	10.2	44.3
50+	49.6	173.7	30.6	113.3	3.6	9.6	38.3
Internal Medicine							
Less than 10%	49.1	148.2	32.7	50.2	3.0	9.6	21.9
10-24%	47.6	120.9	30.4	81.1	2.8	12.9	34.9
25-49%	49.0	137.5	28.7	76.7	2.9	15.2	44.4
50+	48.1	134.6	27.3	74.6	2.8	15.3	50.1
Surgery							
Less than 10%	53.3	142.2	20.9	58.3	3.4	12.8	47.5
10-24%	51.2	146.1	19.6	75.2	4.0	12.7	55.0
25-49%	52.7	153.6	17.7	68.1	4.2	14.9	67.6
50+	51.7	151.0	17.4	63.7	3.9	15.1	67.1
Med-Spec							
Less than 10%	41.9	164.2	32.6	117.1	4.6	6.2	13.0
10-24%	42.2	148.0	31.2	121.3	4.2	6.2	17.0
25-49%	43.2	154.8	28.5	112.6	3.9	10.1	31.3
50+	45.4	120.7	25.3	69.2	3.0	14.8	42.7
Surg-Spec							
Less than 10%	43.1	120.9	28.2	76.7	3.5	5.2	14.1
10-24%	44.7	136.4	26.4	102.8	4.1	7.1	20.1
25-49%	44.5	132.8	26.7	88.6	3.7	7.3	30.1
50+	45.7	139.1	28.9	93.7	3.5	7.1	32.3

*Male physicians only.

Table 10
Physician Income Related to Medicare Patient Focus
(Weighted Means)*

Specialty Group/ % Medicare	Net Income	Net Income/ Patient Hours	Office Follow-up Fee
General Practice			
Less than 10	$48,977	$ 21.38	$ 13.51
10-24%	51,517	23.19	13.00
25-49%	51,351	22.16	12.37
50+	44,549	20.07	11.78
Internal Medicine			
Less than 10	74,345	32.01	16.12
10-24%	52,414	25.29	18.04
25-49%	57,543	26.81	17.51
50+	51,683	24.08	17.65
Surgery			
Less than 10	74,854	30.30	16.14
10-24%	74,228	30.33	15.18
25-49%	79,205	31.21	15.31
50+	77,051	32.89	15.23
Med-Spec			
Less than 10	65,596	33.72	17.38
10-24	65,837	35.32	15.94
25-49	71,611	32.42	18.10
50+	67,103	31.22	20.55
Surg-Spec			
Less than 10	62,057	34.31	14.82
10-24	65,284	31.08	14.64
25-49	68,417	33.15	17.29
50+	71,702	33.28	17.35

*Male physicians only.

c. The net income of physicians, both in aggregate and on an hourly basis, is not related to their Medicare focus.

Unfortunately the sample of female physicians in the HCFA data was too small to allow for a thorough analysis. However, in the four specialties where there were twenty or more female respondents, the following relationship for selected activity and income measures were found. They would clearly suggest a potential for bias in our projections.

Table 11
Comparison of Female and Male Physicians
(Weighted Means)

Specialty Group	Total Patient Hours		Office Hours		Total Visits		Office Visits		Net Income	
	F	M	F	M	F	M	F	M	F	M
Ob-Gyn.	46	53	25	28	112	154	82	101	$41,862	$69,415
General Practice	43	51	32	33	130	189	91	132	31,782	50,453
Pediatrics	45	48	33	36	147	168	118	130	35,574	51,399
Psychiatry	35	41	31	33	33	51	26	37	33,432	51,230

More Complete Empirical Estimation of Physician Activity and Income

The previous discussion focused on three independent variables whose potential impact on the dependent activity and income were of special interest. We looked at the apparent impact of each factor independently. However, it is more appropriate to analyze those factors, along with other variables likely to explain variation among physicians, jointly in a multiple regression framework. However, because of the small number of female respondents, we will continue to focus only on the male physician sample.

Our equations used the following independent variables to explain variations in selected activity and income variables:

A. Physician Characteristics
  1. Age
  2. Board Certification
B. Area Characteristics
  1. County Population
  2. County Physician-Population Ratio
  3. County Per Capita Income
C. Practice Characteristics
  1. Specialty
  2. Group Practice
  3. Percent of Patient Medicare Eligible
  4. INCPATHR (Net Income per Hour of Patient Activity)

independent?

Before presenting the results of the empirical analysis, we will briefly discuss the specification of the independent variables used in our analyses. Five continuous variables were used in all equations: age, county population, county physician-population ratio, county per capita income, and percent of patients Medicare eligible. In addition, the square of the age term was inserted to test for the frequently hypothesized quadratic relationship which would suggest an inverted U relationship between the dependent variable and age. One additional continuous variable was included in the physician activity equation, INCPATHR, to test the responsiveness of the activity variables to apparent economic incentives.

The remaining three variables were specified in a dummy variable format to represent their categorical nature. Board Certification and Group Practice Participation were simply represented by a binary (0,1) variable in the income equations. The specification of the specialty variable differed according to characteristics of the sample used in the estimating equation. Four different samples were used:

Sample 1: All specialties in the HCFA office-based sample excluding Pediatrics, Ob-Gyn., and Psychiatry

Sample 2: General Practice and General Internal Medicine

Sample 3: Surgery (General Surgery, Orthopedic Surgery, and Neurosurgery)

Sample 4: Other Medical and Surgical Specialties

When Sample 1 was used, three separate dummy variables were specified to represent Medical Specialties, Surgical Specialties, and Surgery, respectively. A single dummy variable was used in Sample 2 to represent Internal Medicine. Two dummy variables were used in Sample 3 to represent Orthopedic Surgery and Neurosurgery, respectively. Finally, in Sample 4, one dummy variable was used to represent Other Surgical Specialties. 7

Dependent variables in the analyses were Total Patient Visits, Hospital Inpatient Visits, Office Visits per Office Hour, Office Follow-up Fee, Hourly Wage, and Net Income. The regression results are presented in Table 12. The results for each dependent variable will be discussed in turn.

Total Patient Visits

As expected, total patient visits were positively related to age and negatively related to the square of age, thus suggesting an inverted U relationship. Participation in a group practice also was consistently associated with a greater number of patient contacts. [However, there was no impact of the extent of Medicare patient load on the number of contacts.] The most interesting findings with regard to the specialty groups were the indication that Orthopedic surgeons had a larger number of weekly contacts than General surgeons but that Neurosurgeons had considerably less than either of those other two specialties. ✓

Sample 1, the most inclusive sample, showed a strong negative impact of the three area characteristics on total contacts. The results were less clear in the other three sample. It would appear that per capita income and MD/POP primarily

(standard errors)

Table 12
Multiple Regression Analyses for Physician Activity and Income

Sample Group	R^2	Board	Age	Age^2	Pop	PCINC	MDPOP	MCARE	Group	INCPATHR
Total Patient Visits										
Sample 1	.130		5.04 (1.27)	-.521 (.012)	-.0006 (.001)	-.010 (.002)	.070 (.015)	.002 (.077)	16.72 (3.56)	-.603 (.141)
Sample 2	.216		6.25 (1.76)	-.069 (.017)	.001 (.001)	-.014 (.003)	-.067 (.021)	.212 (.121)	10.47 (5.61)	-.509 (.236)
Sample 3	.105		.903 (3.09)	-.016 (.030)	-.003 (.003)	-.009 (.005)	-.061 (.038)	-.196 (.192)	19.93 (7.54)	.018 (.262)
Sample 4	.063		5.05 (2.19)	-.051 (.021)	-.002 (.002)	-.002 (.003)	-.027 (.025)	.030 (.117)	16.70 (5.69)	-.734 (.228)
Office Visits per Hour										
Sample 1	.082		.060 (.028)	-.0008 (.0003)	.0000 (.0000)	-.0002 (.0000)	-.0011 (.0003)	-.007 (.002)	-.012 (.077)	.015 (.003)
Sample 2	.230		.097 (.035)	-.0010 (.000)	.0000 (.0000)	-.0002 (.0000)	-.0010 (.0004)	-.002 (.002)	-.13 (.110)	.024 (.005)
Sample 3	.137		-.014 (.066)	.0000 (.0006)	-.0000 (.0001)	-.0002 (.0001)	.0001 (.0008)	-.004 (.004)	.095 (.161)	.020 (.006)
Sample 4	.061		.093 (.052)	-.0008 (.0005)	.0000 (.0000)	-.0000 (.0001)	-.0007 (.0006)	-.006 (.0028)	-.055 (.134)	.015 (.005)
Number of Inpatient Hospital Visits										
Sample 1	.154		1.32 (.793)	-.018 (.008)	-.0009 (.0007)	-.002 (.0014)	-.019 (.0094)	.261 (.048)	16.15 (2.22)	
Sample 2	.144		1.30 (.957)	-.016 (.009)	.0002 (.0009)	-.005 (.002)	-.035 (.012)	.273 (.066)	7.16 (3.05)	
Sample 3	.074		1.76 (2.17)	(-.023) (.021)	-.002 (.002)	-.003 (.004)	-.033 (.027)	.061 (.136)	14.03 (5.20)	
Sample 3	.074		1.76 (2.17)	-.023 (.021)	-.002 (.002)	-.003 (.004)	-.033 (.027)	.061 (.136)	14.03 (5.20)	
Sample 4	.152		.025 (1.43)	-.004 (.014)	-.0001 (.0001)	-.0001 (.002)	-.012 (.016)	.358 (.077)	24.76 (3.75)	

Sample Group	Surg.	Med-Spec.	Surg-Spec.	IM	OS	NS	Surg-Spec.
Total Patient Visits							
Sample 1	-16.9 (4.88)	-20.3 (4.81)	-16.0 (4.79)				
Sample 2				-29.4 (5.76)			
Sample 3					18.44 (9.20)	-23.17 (10.17)	
Sample 4							7.63 (5.39)
Office Visits per Hour							
Sample 1	-.060 (.106)	-.332 (.104)	-.098 (.104)				
Sample 2				-.69 (.113)			
Sample 3					.424 (.197)	-1.01 (2.18)	
Sample 4							.491 (.127)
Number of Inpatient Hospital Visits							
Sample 1	17.65 (3.07)	-17.06 (2.98)	-13.69 (2.96)				
Sample 2				14.45 (3.12)			
Sample 3					-8.56 (6.46)	8.02 (7.05)	
Sample 4							3.17 (3.59)

Table 12 (Continued)
Multiple Regression Analyses for Physician Activity and Income

Sample Group	R^2	Board	Age	Age^2	Pop	PCINC	MDPOP	MCARE	Group	INCPATHR
Office Follow-up Fee										
Sample 1	.289	1.23 (.302)	.243 (.099)	-.003 (.001)	.0009 (.0001)	.0014 (.0002)	.006 (.001)	.019 (.006)	-.223 (.280)	
Sample 2	.512	.743 (.071)	-.091 (.102)	-.011 (.0010)	.0007 (.0001)	.0013 (.0002)	.007 (.001)	.003 (.007)	.176 (.328)	
Sample 3	.256	-.860 (.771)	.264 (.279)	-.003 (.003)	.001 (.0002)	.0009 (.0005)	.010 (.003)	-.010 (.017)	-.231 (.663)	
Sample 4	.264	2.16 (.634)	.406 (.188)	-.004 (.002)	.0011 (.0002)	.0015 (.0003)	.004 (.002)	.036 (.010)	-.626 (.499)	
Net Income										
Sample 1	.150	7002 (1355)	2966 (443)	-30.7 (4.25)	.607 (.399)	.176 (.786)	-6.72 (5.26)	-6.81 (26.68)	10,212 (1258)	
Sample 2	.127	3421 (1839)	2821 (572)	-28.4 (5.41)	.620 (.530)	-.566 (1.11)	-14.27 (6.90)	-6.66 (39.71)	8199 (1846)	
Sample 3	.145	9264 (3317)	1850 (1199)	-16.6 (11.6)	.112 (.102)	-1.21 (1.98)	-16.30 (14.52)	-1.86 (73.96)	11364 (2856)	
Sample 4	.150	3211 (2587)	3629 (767)	-37.8 (715)	.310 (.664)	.649 (1.23)	-1.50 (8.82)	22.17 (41.53)	9700 (2039)	
Net Income per Hour										
Sample 1	.136	3.72 (.713)	1.34 (.233)	-.013 (.002)	.0006 (.0002)	.0005 (.0004)	.0016 (.0028)	-.016 (.014)	3.94 (.663)	
Sample 2	.086	1.21 (.950)	1.13 (.296)	-.011 (.003)	.0005 (.0003)	.0002 (.0005)	.002 (.004)	-.027 (.021)	3.03 (.954)	
Sample 3	.165	6.33 (1.64)	.660 (.592)	-.007 (.006)	.0006 (.0005)	-.0002 (.001)	-.0014 (.007)	-.024 (.037)	5.24 (1.41)	
Sample 4	.074	1.46 (1.46)	.167 (.439)	-.016 (.004)	.0009 (.0004)	.0004 (.0007)	-.0001 (.005)	-.026 (.023)	3.22 (1.17)	

Sample Group	Surg.	Med-Spec.	Surg-Spec.	IM	OS	NS	Surg-Spec.
Office Follow-up Fee							
Sample 1	-1.26 (.386)	.824 (.379)	-.034 (.383)				
Sample 2				3.24 (.336)			
Sample 3					1.03 (.821)	5.69 (.887)	
Sample 4							-1.01 (.475)
Net Income							
Sample 1	3823 (1735)	1574 (1700)	5614 (1722)				
Sample 2				4759 (1894)			
Sample 3					7411 (3535)	11463 (3817)	
Sample 4							4668 (1938)
Net Income per Hour							
Sample 1	.747 (.914)	5.16 (.898)	5.31 (.907)				
Sample 2				3.55 (.979)			
Sample 3					3.36 (1.75)	7.67 (1.89)	
Sample 4							.380 (1.11)

are associated with variation among the primary care physicians. Finally, the coefficient of the income variable included suggests that physicians earning more per hour see fewer patients each week.

Office Visits Per Hour

In all equations there was a significant positive relationship to income per patient hour which probably reflects the fact that higher incomes per hour are earned by physicians seeing more patients each hour. In the overall equation and in the General Practice and Internal Medicine sample, age and age^2 were significant with positive and negative signs, respectively, and county per capita income and MD/POP were negatively related to office visits per hour.

Hospital Inpatient Contacts

This equation was primarily focused on testing the impact of Medicare orientation on the amount of hospital inpatient contact. In each of the equations, except for the General Surgery sample, the Medicare term was strongly significant with a positive coefficient.

Several other findings also are of interest, however. There was a consistent significant positive relationship between participation in group practice and the number of hospital visits. Combined with the size of the coefficient for total contacts, it would appear that the primary impact of group practice on activity is the increase in inpatient contact. Also, there is an indication that the lower number of total patient contacts for the physicians in the Internal Medicine Specialty group and in the Surgical Specialty group relative to General Practice and General Internal Medicine physicians is also almost entirely associated with fewer inpatient hospital visits.

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Office Follow-up Fee

The three variables reflecting county characteristics consistently showed a strong positive relation to the dependent variable. Board Certification also showed a positive relation in all samples except Sample 3, which included General Surgery, Orthopedic Surgery, and Neurosurgery. Whereas Medicare focus was positively related in the Sample 1 overall equation, there was no significant relationship identified either in Sample 2 or Sample 3.

It would appear that the physicians in the Medical Specialty group had the highest office follow-up fees; that Internal Medicine specialists charged about three dollars more per visit than General Practice physicians; and that Neurosurgeons had a fee more than five and one-half dollars greater than the fee of General Surgeons.

Net Income

The one variable with consistent impact was Group Practice, which was positively related with a coefficient over 10,000 in the Sample 1 overall equation. On the other hand, the extent of Medicare patients never had any impact which would suggest that physicians participating in a major way in the program earn income in absolute dollars comparable to those with lesser participation.

In the Sample 1 equation, Board Certification has an strong positive relation to net income. However, that only is true again in the Sample 3 regression. Once more age appears to have an inverted U relationship with the dependent variable. The physician-population ratio and other area characteristics did not appear to affect the level of money net income received.

The results for the equation with Net Income Per Hour as the dependent variable were similar to those equations with Net Income as dependent variable.

Another approach to identification of the factors affecting variation in physician net income was somewhat more enlightening than that reported above. Physicians were grouped by net income categories and then their activity characteristics and implicit wage and fee levels were analyzed as portrayed in Table 13. The significant findings from that analysis are listed below.

1. Higher income physicians work many more hours on the average and see many more patients than lower income physicians. & more per hour
2. Higher income physicians averaged between 50 percent and 90 percent more office visits each office hour than lower income physicians.
3. While there is a slight tendency for higher income physicians to have higher office follow-up fees, those fee differentials cannot explain the 150 percent to 250 percent differences in net income per patient hour.

Finally, in Table 14 we compare the proportion of physicians in the highest and lowest income categories by specialty with their overall distribution in one weighted sample. The high proportion of physicians in the General Surgery and Surgery Specialties groups earning more than $80,000 is highlighted in the table. Moreover, it is shown that almost 45 percent of physicians earning less than $30,000 were in General Practice although physicians in that specialty also composed the second largest group earning more than $80,000.

Summary of Potential Impact

Based on the evidence we have accumulated on the relationships between physician activity and the several area characteristics we have analyzed — population size, income per capita, and the number of physicians relative to population — it would appear that different patterns of distribution of the increment in physician stock during the next decade would primarily affect the number of aggregate contacts but not the level of aggregate expenditures.

Our tabular analyses consistently portrayed a substantial decline in physician contact as the area descriptors moved from their lower to higher values. The regression results suggest that the movement was primarily associated with

Table 13
Characteristics of Physician Practice Related to Physician Annual Net Income
(Weighted Means)*

Specialty Group/ Net Income (Thousands of Dollars)	Age	Patient Hours	Percent Office Visits	Number Office Visits	Number of Total Patient Contacts	Office Visits/ Office Hour	Office Follow-up Fee	Net Income/ Patient Hours
General Practice								
$ 30	61.4	41.8	75.8	79.5	111.8	3.1	$12.20	$ 11.77
30-49	54.5	51.3	75.1	127.5	175.0	4.1	12.02	17.76
50-79	49.8	56.3	71.7	149.8	225.2	4.6	12.68	24.55
80+	52.7	57.4	71.9	179.9	263.3	5.2	13.08	39.22
Internal Med.								
30	56.1	45.6	66.5	55.9	91.4	2.2	16.30	13.52
30-49	50.7	48.5	62.1	71.8	126.5	2.7	17.79	19.37
50-79	48.8	50.3	61.8	78.8	137.9	2.8	17.33	28.25
80+	49.2	50.6	56.3	91.1	177.4	3.3	19.26	42.52
Pediatrics								
30	53.4	42.7	82.4	85.7	109.7	2.8	12.97	14.72
30-49	47.9	47.8	83.1	119.7	150.8	3.6	12.69	19.22
50-79	47.3	49.6	80.7	146.4	188.7	4.3	12.62	27.44
80+	47.3	51.2	80.2	183.1	229.7	4.8	13.04	38.47
Surgery								
30	54.6	48.8	53.9	52.7	96.1	2.7	15.11	12.91
30-49	51.1	48.9	49.7	57.4	124.8	3.2	15.18	19.23
50-79	49.4	52.6	48.0	67.2	145.3	4.0	14.97	28.03
80+	48.0	52.4	46.2	80.4	182.7	4.6	15.25	44.35
Ob-Gyn.								
30	60.0	43.8	68.0	57.4	98.5	2.7	17.67	16.66
30-49	51.8	49.3	71.5	81.8	118.4	3.2	18.16	21.23
50-79	48.2	52.5	70.2	105.6	155.6	4.0	17.13	28.04
80+	48.0	56.4	69.1	116.2	175.5	4.6	17.52	40.41

*Male physicians only

Table 13 (Continued)
Characteristics of Physician Practice Related to Physician Annual Net Income
(Weighted Means)*

Specialty Group/ Net Income (Thousands of Dollars)	Age	Patient Hours	Percent Office Visits	Number Office Visits	Number of Total Patient Contacts	Office Visits/ Office Hour	Office Follow-up Fee	Net Income/ Patient Hours
Med Spec.								
$ 30	54.8	41.1	82.4	81.9	102.2	2.9	$15.82	$ 14.23
30-49	51.4	38.2	80.7	94.1	115.7	3.3	17.53	25.15
50-79	47.5	44.0	74.5	101.8	134.1	3.5	17.75	33.44
80+	46.8	44.9	65.3	117.9	169.0	4.5	19.58	45.83
Surg-Spec.								
30	60.9	33.3	90.8	71.4	82.5	2.4	15.65	13.07
30-49	53.0	41.8	76.6	78.3	112.9	3.1	17.28	23.92
50-79	48.3	47.0	74.4	90.1	130.0	3.5	15.84	31.22
80+	47.3	47.7	70.5	116.7	174.4	4.6	17.16	46.06
Psychiatry								
30	56.2	33.1	83.5	26.6	34.1	0.9	—	16.60
30-49	48.7	38.6	84.2	33.7	43.4	1.1	—	24.78
50-79	49.0	43.6	80.1	41.2	59.5	1.2	—	31.48
80+	46.2	48.4	71.3	46.8	76.7	1.4	—	41.83

Table 14
Distribution of Specialty Groups in the Highest and Lowest Net Income Categories
(Weighted Sample)

Specialty Group	Overall Percentage	Percentage Less than $30,000	Percentage Greater than $80,000
General Practice	27.8	44.8	15.3
Internal Medicine	14.8	16.4	10.1
Pediatrics	9.3	5.5	2.5
Surgery	16.7	10.1	30.4
Ob-Gyn.	6.1	5.4	13.7
Med-Spec.	7.8	3.1	6.9
Surg-Spec.	11.0	7.7	17.1
Psychiatry	6.5	6.9	4.1
All Specialties	100.0	100.0	100.0

variance in total population size and MD/POP. Moreover, the explanatory power of these variables was greatest in the sample using the General Practice and General Internal Medicine physicians. These two groups are providers of relatively large numbers of visits each week and are more evenly distributed among the counties than other specialties. These specialties also will provide a substantial number of the increments in physicians during the next decade.

There was no clear pattern in the net income and gross income measures across counties as related to the area descriptors. While follow-up office fees were positively associated with all the area variables, patient contacts generally were inversely related. Although no data are available to evaluate the general cost of living in counties distributed by size, income levels, and physician density, we would presume that it is higher where income per capita and physician density are greater. That would imply that real physician income is lower in those locations.

Our cross-section analyses suggest that increases in the proportion of females in the physician stock clearly will affect the overall average levels of activity and expenditure estimates. However, the only impact indentified for association with rising Medicare loads is the shifting of partient contact somewhat from office settings to inpatient hospital settings.

Projecting Changes in the Distribution of Physicians Among Counties

We will first review some of the recent papers dealing with aggregate patterns of physician location and then suggest some analyses we propose to undertake during the Second Option Year.

Lorna E. Wunderman in a recent paper has reviewed the trends in the geographic distribution of physicians between 1968 and 1977.[1] During that period there was an increase of slightly more than 100,000 physicians, and the national physician-population ratio increased about 22 percent from 120 to 146.

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[1] Lorna E. Wunderman, "Trends in the Geographic Distribution of Physicians: 1968, 1976, and 1977," American Medical Association, Profile of Medical Practice 1979, pp. 35-52.

The data presented on the nine-year changes in state physician population ratios clearly suggest an overall tendency toward a reduction in the inequality of distribution. The five states with the lowest physician-population ratios in 1968 (averaging 68 physicians per 100,000 population) had an average 46 percent increase in that ratio, ranging from 23 percent to 54 percent. In comparison, the five states with the highest physician-population ratios in 1977 (averaging 160) had an average 17 percent increase during the nine years, ranging from 7 percent to 23 percent. Looking at the movement from a different perspective provides a similar portrayal. The five states with the largest percentage increase (averaging 49 percent) started the period with an average physician-population ratio of 81 while the five states with the lowest percentage increase (9 percent) started the period with a physician-population ratio of 135. Wunderman points out that the geographic distribution of physicians is improving at a faster rate for nonprimary than for primary care specialities. She also shows that major shifts in distribution appeared to occur from 1976 to 1977 when almost 12,000 additional physicians were counted. Finally, the data show that the geographic distribution of women physicians differs from that of males.

Steiber reviewed the mobility of physicians from 1971 through 1975 using data from the year-end AMA Physician Master files.[1] About 15 percent of physicians, excluding those in residency training, moved from one county to another during the period. Several findings are of relevance to our research focus. First, Steiber found that physicians are leaving the West North Central, the East North Central, and the Middle Atlantic census divisions of the United States in greatest numbers. Their destinations are disproportionately in the Mountain, South Atlantic, and Pacific divisions. Steiber found that a substantial proportion of the movers had left the very large urban centers to locate in middle-sized metropolitan and small areas. Movers also were found more often in non-primary care specialties than in primary care.

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[1] Steven R. Steiber, "Geographic Mobility of Physicians: 1971-1975," American Medical Association, Profile of Medical Practice 1980, pp. 67-80.

Way, in an earlier study similar to Wunderman's covering the period from 1968 to 1976, emphasized differences in the trends between primary care and non-primary care physicians.[1] He noted that change in the ratio of physicians to population in secondary and tertiary care were more rapid in those states which had relatively low physician-population ratios. However, the reverse was true for primary care physicians. Their increase relative to population was greatest in those states which had started the period with higher ratios.

Lawler and Reid used regional economic theory to evaluate hierarchical patterns in physician locations.[2] Their analyses showed that presence of physician specialties basically followed a predictable, incremental pattern: More highly specialized physicians were not located in counties lacking less specialized physicians for the most part. The authors conclude that the difference in resource supply for different area types suggest that distributional analyses for physicial specialists — inlcuding those in primary care specialties — should acknowledge differences in the underlying population and resource bases that support different levels of specialization.

The existence of hierarchical patterns in physician location provides several important questions to be considered in the analysis of potential patterns during the next decade. First, there is the question as to when the primary round of specialty distribution is complete and each market area has attracted at least one of each physician specialty that it can support with its financial base, hospital facilities, and demographic characteristics. Then there is the question as to whether, once representation of a specialty has located in those counties, additional rounds of location will follow a similar hierarchical pattern.

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[1] Peter O. Way, "Patterns in the Geographic Location of Physicians: 1968-1976," American Medical Association, Profile of Medical Practice 1978, pp. 29-54.

[2] Anna C. Lawler and Jack T. Reid, "Hierarchical Patterns in the Location of Physician Specialists Among Counties," Inquiry (Spring 1981), pp. 79-90.

In last year's report, we portrayed the implications of the assumption that the physician-population ratio in all counties increased in the same proportion as projected nationwide. As shown in Table 15, we found that whereas only 14 percent of all physicians were located in counties with over 300 physicians per 100,000 in 1974, 32 percent of all physicians would be located in areas with that high a MD/POP ratio in 1990. Moreover, 55 percent of all physicians would be located in counties with MD/POP greater than 250 in 1990 as compared to only 20 percent in 1974. The distribution, of course, varies considerably by specialty groups. Even in 1990, only 42 percent of primary care physicians would be located in the counties with MD/POP greater than 250, while 56 percent of medical specialists and 67 percent of psychiatrists would be located in those counties.

The evidence presented from the studies referenced earlier clearly suggests that alternative models of physician distribution among counties in 1990 other than that of proportionate increase should be developed. We believe that a model reflecting those findings will:

1. Separately analyze different specialty groups
2. Have greater proportionate increases overall in the counties which start with lower physician-population ratios
3. Reflect recent trends in overall population movement on a regional and statewide basis and projections of those movements for the next decade.

The model we will first evaluate for consideration in allocating physicians will have two steps. We will begin by estimating the change in physician-population ratios by state for each of our specialty groups (except we will combine

TABLE 15

DISTRIBUTION OF COUNTIES AND PHYSICIANS BY M.D./POP RATIO OF COUNTIES, 1974 AND 1990 *

M.D./POP (Per 100,000)	PERCENT OF COUNTIES		PERCENT OF ALL ACTIVE PHYSICIANS		OFFICE-BASED PHYSICIANS									
					PERCENT OF GP, PED, IM		PERCENT OF GS, NS, OS, OB-GYN		PERCENT OF MED. SPEC.		PERCENT OF SURGERY SPEC.		PERCENT OF PSYCHIATRISTS	
	1974	1990	1974	1990	1974	1990	1974	1990	1974	1990	1974	1990	1974	1990
< 50	48.1%	29.4%	3.7%	1.9%	7.7%	3.5%	3.0%	1.3%	1.6%	1.1%	2.0%	1.1%	1.1%	.6%
50 - 99	35.1	38.9	12.6	6.0	19.9	12.0	16.9	7.0	9.7	2.7	15.5	5.1	7.4	2.2
100 - 149	10.4	17.2	17.8	10.9	19.8	15.2	22.9	15.6	19.8	10.2	23.1	14.7	15.4	7.6
150 - 199	3.6	7.1	26.4	12.9	24.0	14.1	25.4	16.4	28.6	14.4	26.3	16.5	26.4	11.0
200 - 249	1.4	3.4	18.2	13.2	15.8	13.3	17.1	14.9	20.5	15.3	17.2	15.1	19.4	11.7
250 - 299	.6	1.5	7.5	23.1	5.5	20.2	6.1	21.0	7.7	24.5	6.5	21.6	10.4	24.9
300 +	.8	2.3	13.8	32.0	7.3	21.6	8.6	24.4	12.1	31.8	9.3	25.8	20.2	42.0

* Based on assumption that M.D./POP in each county increases by forty percent between 1974 and 1990.

General Practice and General Internal Medicine). The equation to be used will be estimated from 1970-1979 A.M.A. data and will take the following general form:

$$(1) \quad \frac{(MD/POP)_{y}^{1979}}{(MD/POP)_{y}^{1970}} = f\left[(MD/POP)_{ij}^{1970}, \frac{(MD/POP)_{Nj}^{1979}}{(MD/POP)_{Nj}^{1970}}, \frac{(Ys/Y_{N})^{1979}}{(Ys/Y_{N})^{1970}}\right]$$

Where $(MD/POP)_{ij}$ = the physician population ratio for specialty group j in state i, with the subscript N referring to the national value,

Y_s = State per capita income with the subscript N referring to the national value.

The next steps will allocate physicians to counties. Our allocation equation will be similar to that portrayed in (1) except that counties are represented by the subscript i and the state by subscript N, and a term for county population in 1979 will also be included. We will use a sample of states to estimate the coefficient for the county allocation. Alternative estimation forms such as logarithmic transformation will be considered.

Once the equations are estimated, we will use the past trend on projections for Ys/Y_N in 1990 and our national projections of MD/POP for 1990 to forecast state physician population ratios in 1990. Then, using the forecasted state values, county estimates can be made.

Projecting the Distribution of Physicians Among Specialties by Sex

The underlying data we have used to project the specialty distribution by sex in 1990 were the percentage distribution of women physicians under age 45 at the end of 1978 combined with the distribution of the 10,480 female resident physicians at the same time.[1] A weighted average was used which gave a weight of 60 percent to the resident distribution and 40 percent to the under-45 distribution. The additional weight for the resident distribution is based on the estimate that the number of female physicians will slightly more than double from its level in 1977 to 1990.[1] When separation due to death and retirement are taken into account, the additional weight seems appropriate. Our estimated distribution for 1990 is portrayed in Table 16. The assumptions used in the calculation are listed below.

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[1] Lorna E. Wunderman, "Female Physicians in the 1970s: Their Changing Roles in Medicine," American Medical Association, Profile of Medical Practice 1980, pp. 51-66.

1. The total number of female residents in 1990 was estimated to be equal to the number of women entering medical school for the 1983-84, 1984-85, and 1985-86 school years.[2]
2. The distribution of female residents among specialties in 1990 was assumed to be equal to that same distribution in 1978.[3]
3. The proportion of female physicians in each specialty, excluding residents who were in office-based practices assumed to be the same as those existing in December, 1976.[3]

The substantial potential impact due to the change in the proportion of female physicians is clearly identified in Table 16. First we see that the aggregate shift for office-based physicians in the study specialties is from 5.1 percent to 14.3 percent. Within-specialty shifts are much more dramatic. It is estimated that:

- 17.7 percent of general internists in 1990 will be women as compared to 4.7 percent in 1977.
- 41.8 percent of pediatricians in 1990 will be women as compared to 17.8 percent in 1977.
- 21.4 percent of Ob-Gyn. specialists in 1990 will be women as compared to 6.3 percent in 1977.
- 16.2 percent of medical specialists in 1990 will be women as compared to 4.7 percent in 1977.
- 4.4 percent of psychiatrists in 1990 will be women as compared to 11.0 percent in 1977.

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[1] U.S. Department of Health and Human Services, The Current and Future Supply of Physicians and Physician Specialists (1980).

[2] U.S. Department of Health and Human Services, The Current and Future Supply of Physicians, p. I-14.

[3] Lorna E. Wunderman, "Female Physicians in the 1970s," pp. 56-57.

Table 16
Estimate of Distribution Among Specialty Groups of Office-Based Female Physicians in 1977 and 1990

Specialty Group	1977 Number	1977 Percent	1977 Percent of all Physicians in Specialty	1990 Number	1990 Percent	1990 Percent of all Physicians in Specialty
General Practice	2,099	22.6	4.5	6,013	13.6	8.3
General Internal Medicine	1,320	14.2	4.7	10,174	23.0	17.7
Pediatrics	2,312	24.9	17.8	12.365	28.0	41.8
Ob-Gyn.	1,000	10.8	6.3	5,395	12.2	21.4
Medical Specialties	622	6.7	4.7	5,072	11.4	16.2
General Surgery	157	1.7	0.8	2,870	6.5	7.3
Surgical Specialties	407	4.4	1.2	1,398	3.2	4.4
Psychiatry	1,366	14.7	11.0	942	2.1	4.4
Total	9,283	100.0	5.1	44,229	100.0	14.3

Appendix A

Additional Empirical Results

Major Findings

The cross-tabulations presented in the text focused on the variables considered most likely to be associated with a change in physician distribution during the next decade. In addition to the tabulations using MD/POP and Medicare patient focus as the independent variables, we prepared similar tabulations of physician activity and income as related to county per capita income and population size, physician age, board certification, and Medical patient focus.

Suggested relationships highlighted in the tables are:

1. Physicians in higher per capita income counties and in counties with greater populations have fewer patient contacts.
    a. Especially large differences in the number of patient contacts were identified in the category of inpatient hospital visits for the primary care specialists of General Practice, Internal Medicine, and Pediatrics.
2. Physicians in higher per capita income counties and in counties with greater population charge substantially higher fees. However, neither hourly wage nor net income of physicians in higher per capita income counties is consistently greater than those in lower per capita income counties.
3. The average net income and hourly wage of board-certified physicians are greater than those of non board-certified physicians. However, practice patterns in terms of the number and location of patient contacts and office visits per office hour were not related to certification status.
4. The fees of the youngest physicians seem to be somewhat less than those of the other age groups. Generally their incomes follow the same pattern.
5. Generally it appears that the youngest physicians have a greater proportion of their patient contacts in the hospital setting.
6. There are no consistent patterns relating physician practice to Medicaid patient focus.

Table 17
Physician Activity and Income Related to County Per Capita Income
(Weighted Means)*

Specialty Group/ Income per Capita	Patient Contact Hours	Total Patient Contacts	Office Visits	Inpatient Hospital Visits	Office Visits/ Office Hour	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
	Weekly Rates							
General Practice								
2000-3499	56.3	237.5	158.7	59.7	4.7	10.18	20.73	53,573
3500-4249	53.5	201.6	131.3	42.3	4.4	11.07	21.70	52,802
4250-4999	48.6	180.2	133.1	31.0	4.3	12.38	21.52	49,542
5000-5749	50.2	171.8	123.8	31.0	4.0	15.09	23.93	50,296
5750+	49.2	128.0	89.8	21.1	2.9	14.46	19.86	40,914
Internal Medicine								
2000-3499	51.9	205.1	109.5	80.4	3.8	12.86	25.58	59,160
3500-4249	47.2	154.9	96.0	52.4	3.3	14.81	26.16	57,108
4250-4999	49.4	129.0	68.1	43.4	2.7	16.04	24.29	52,677
5000-5749	48.2	122.3	72.2	37.3	2.7	18.59	25.88	56,788
5750+	47.6	123.5	67.3	37.2	2.6	21.41	25.66	57,148
Pediatrics								
2000-3499	54.8	196.0	136.3	40.4	3.9	11.65	19.82	49,126
3500-4249	52.4	203.1	146.1	42.4	4.3	10.93	23.18	57,591
4250-4999	47.4	173.3	133.0	29.8	4.1	12.27	24.55	53,226
5000-5749	46.7	152.7	123.7	18.5	3.7	13.41	23.80	46,881
5750+	46.8	141.6	116.3	17.3	3.4	14.57	24.61	50,383
Surgery								
2000-3499	59.2	224.1	104.2	80.1	4.9	12.45	28.38	76,338
3500-4249	51.6	157.4	71.1	62.8	4.2	14.15	30.73	76,149
4250-4999	52.1	149.4	69.9	62.1	4.1	14.16	31.94	77,066
5000-5749	50.0	130.0	59.9	55.5	3.6	16.86	31.12	77,280
5750+	51.7	136.4	61.0	51.4	3.6	20.06	29.24	66,486

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Table 17(Continued)
Physician Activity and Income Related to County Per Capita Income
(Weighted Means)*

Specialty Group/ Income per Capita	Patient Contact Hours	Total Patient Contacts	Office Visits	Inpatient Hospital Visits	Office Visits/ Office Hour	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
	Weekly Rates							
Ob-Gyn.								
2000-3499	59.4	185.5	116.7	45.7	4.1	14.60	30.40	81,009
3500-4249	55.2	176.2	110.6	52.6	4.3	15.50	28.87	73,285
4250-4999	53.2	151.9	100.1	34.5	4.0	16.80	26.99	62,565
5000-5749	49.8	140.3	97.4	32.4	3.9	19.03	32.67	75,264
5750+	51.8	151.5	90.1	37.1	4.0	22.59	29.48	62,213
Med-Spec.								
2000-3499	—	—	—	—	—	—	—	—
3500-4249	44.7	183.9	125.2	38.4	4.5	15.67	29.72	66,984
4250-4999	43.8	146.7	106.1	30.2	3.9	16.21	33.63	64,623
5000-5749	42.4	130.6	93.4	22.2	3.4	19.56	32.95	72,654
5750+	44.5	127.4	91.7	29.6	3.2	22.64	34.41	67,048
Surg Spec.								
2000-3499	45.4	133.9	87.1	22.0	3.7	12.13	30.07	66,550
3500-4249	48.1	150.1	105.0	30.3	3.8	14.18	32.40	69,134
4250-4999	45.4	136.9	88.5	29.6	3.8	15.77	32.63	71,405
5000-5749	42.8	121.0	89.4	22.1	3.5	18.79	31.81	63,589
5750+	44.4	126.8	89.7	26.3	3.6	20.14	34.42	74,054
Psychiatry								
2000-3499	—	—	—	—	—	—	—	—
3500-4249	42.3	70.5	37.8	28.7	1.4	—	27.80	58,263
4250-4999	43.1	55.5	37.7	12.9	1.2	—	27.76	52,274
5000-5749	40.2	45.6	35.9	6.8	1.1	—	27.88	49,789
5750+	38.0	41.7	34.8	3.4	1.1	—	27.59	48,146

Table 18
Physician Activity and Income Related to County Population
(Weighted Means)*

Specialty Group/ County Population (in thousands)	Total Patient Visits	Office Visits/ Office Hours	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
General Practice					
Less than 50	226.3	4.6	$10.09	$21.38	$55,962
50-249	198.4	4.4	11.63	21.03	51,473
250-324	226.3	4.2	12.18	22.37	49,355
325-824	178.8	3.9	13.84	21.56	47,109
825-1,399	160.5	3.9	14.08	21.01	41,330
1,400+	155.6	3.7	15.84	24.53	47,754
Internal Medicine					
Less than 50	188.2	3.6	13.53	25.34	59,345
50-249	158.0	3.1	14.66	25.30	56,002
250-324	132.7	2.9	15.48	29.01	61.507
325-824	121.3	2.7	17.09	25.24	54,187
825-1,399	130.6	3.0	18.64	22.62	51,754
1,400+	112.4	2.5	21.63	26.41	57,666
Pediatrics					
Less than 50	211.4	4.2	11.14	20.14	51,386
50-249	199.0	4.4	11.44	23.63	49,452
250-324	201.6	4.3	11.35	21.30	53,274
325-824	155.6	3.6	12.40	24.78	53,474
825-1,399	137.0	3.4	13.88	25.22	51,465
1,400+	149.2	3.8	14.83	23.77	51,809
Surgery					
Less than 50	187.5	4.4	11.86	29.56	73,510
50-249	155.1	4.1	13.57	31.16	76,819
250-324	170.2	4.4	14.67	34.86	87,052
325-824	140.2	4.0	15.16	29.69	72,257
825-1,399	124.4	3.4	18.65	30.23	75,672
1,400+	133.7	3.7	19.08	33.18	77,888

Table 18 (Continued)
Physician Activity and Income Related to County Population
(Weighted Means)*

Specialty Group/ County Population (in thousands)	Total Patient Visits	Office Visits/ Office Hours	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
Ob-Gyn.					
Less than 50	177.1	3.6	13.94	24.78	65,395
50-249	173.5	4.3	15.56	29.86	73,039
250-324	187.5	4.6	19.21	25.82	65,025
325-824	136.6	3.9	17.82	32.55	67,394
825-1,399	142.1	3.6	19.64	28.22	68,505
1,400+	133.6	3.7	21.04	28.65	71,098
Med-Spec.					
Less than 50	171.0	4.1	14.09	30.55	67,775
50-249	144.9	3.6	15.22	31.36	56,928
250-324	170.4	4.6	15.56	31.14	62,395
325-824	153.7	4.1	17.43	33.60	67,665
825-1,399	133.1	3.6	19.32	36.22	66,922
1,400+		3.4	21.60	32.02	70,560
Surg-Spec.					
Less than 50	137.1	3.4	13.34	32.34	56,928
50-249	144.8	3.7	13.55	31.08	62,395
250-324	167.9	4.5	14.04	30.89	67,666
325-824	123.2	3.2	16.38	30.81	66,922
825-1,399	127.1	3.6	18.70	36.11	70,561
1,400+	121.9	3.9	21.62	37.08	71,875
Psychiatry					
Less than 50	57.3	1.3	—	29.92	51,798
50-249	71.4	1.3	—	27.85	54,098
250-324	52.0	1.1	—	24.61	41,679
325=824	48.6	1.1	—	28.83	54,454
825-1,399	45.6	1.1	—	28.14	52,031
1,400+	41.3	1.0	—	26.73	46,989

Table 19
Physician Activity and Income Related to Physician Age
(Weighted Means)*

Specialty Group/ Physician Age	Patient Contact Hours	Total Patient Contacts	Total Office Hours	Total Office Contacts	Office Contacts/ Office Hours	Total Hospital Inpatient Visits	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
	—Weekly Rates—								
General Practice									
20-39	55.7	219.5	34.9	150.2	4.5	48.5	$11.93	$20.37	$ 47,372
40-49	55.2	222.5	35.5	156.2	4.7	43.0	12.68	22.62	59,199
50-59	53.0	202.6	33.4	137.6	4.6	38.4	13.15	24.83	59,149
60+	45.7	142.7	30.1	102.4	3.4	28.3	11.97	19.11	37,707
Internal Medicine									
20-39	47.7	131.4	26.3	69.4	2.7	52.1	17.68	24.67	54,101
40-49	52.0	150.6	29.8	80.6	3.0	52.2	18.08	26.59	62,602
50-59	45.7	127.3	28.9	76.1	2.9	35.8	17.40	27.51	55,932
60+	48.5	117.5	28.9	64.5	2.4	34.5	16.91	21.01	46,811
Pediatrics									
20-39	49.3	183.3	36.6	134.8	4.0	34.0	11.81	22.98	51,406
40-49	49.9	171.4	35.8	129.5	4.0	28.1	12.88	23.50	52,797
50-59	47.7	166.1	35.3	135.3	3.9	24.7	13.06	26.04	56,026
60+	44.2	139.1	33.8	112.0	3.5	16.4	13.19	21.21	39,208
Surgery									
20-39	53.7	141.6	17.1	59.8	3.9	59.0	14.77	29.45	75,377
40-49	52.7	154.8	17.9	69.8	4.3	65.4	15.64	32.55	84,855
50-59	51.9	160.0	18.8	75.1	4.2	64.5	15.99	32.88	77,265
60+	48.1	125.2	21.1	64.1	3.1	46.7	14.97	27.38	59,208

*Male physicians only

Table 19(Continued)
Physician Activity and Income Related to Physician Age
(Weighted Means)*

Specialty Group/ Physician Age	Patient Contact Hours	Total Patient Contacts	Total Office Hours	Total Office Contacts	Office Contacts/ Office Hours	Total Hospital Inpatient Visits	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
	Weekly Rates								
Ob-Gyn.									
20-39	57.7	175.7	27.9	111.9	4.4	45.9	16.23	25.45	67,060
40-49	54.0	169.3	28.7	107.7	4.3	40.1	18.65	31.74	78,481
50-59	53.4	149.5	27.6	97.8	3.8	35.9	17.67	31.10	74,228
60+	43.4	110.4	25.7	78.1	3.2	26.9	18.77	27.65	49.683
Med-Spec.									
20-39	45.3	128.2	27.6	88.9	3.1	33.1	17.60	33.67	67,699
40-49	44.8	143.8	28.4	96.1	4.0	30.4	18.43	32.68	66,007
50-59	41.6	148.2	29.9	109.6	3.8	25.3	18.33	35.30	79,342
60+	42.6	157.6	30.7	122.3	4.0	24.5	18.03	29.70	56,980
Surg-Spec.									
20-39	47.3	145.3	28.1	98.7	3.8	31.2	15.66	31.25	66,128
40-49	47.9	145.8	27.8	99.7	4.0	28.4	16.22	34.25	79,578
50-59	43.6	137.8	25.8	89.6	4.0	31.4	17.44	37.77	77,859
60+	40.5	102.2	28.6	76.8	2.9	16.3	17.12	28.61	50,432
Psychiatry									
20-39	40.2	48.9	30.8	33.2	1.1	11.5	—	28.08	50,922
40-49	41.4	51.8	32.2	36.4	1.2	10.8	—	28.70	56,011
50-59	41.6	54.2	35.6	39.6	1.1	11.0	—	27.83	52,048
60+	38.7	46.3	33.6	35.7	1.1	9.3	—	25.57	39,183

Table 20
Physician Activity and Income Related to Board Certification (Weighted Means)*

Specialty Group/ Board Certification	Total Patient Contacts	Office Visits	Office Visits/ Total Patient Contact	Office Visits/ Office Hours	Inpatient Hospital Visits	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
	Weekly Rates							
General Practice								
Certified	210.2	142.1	71.8	4.5	18.7	12.58	24.16	60,530
Not Certified	181.7	128.3	74.5	4.1	18.1	12.47	21.03	47,229
Internal Medicine								
Certified	135.0	71.1	60.4	2.7	47.7	18.73	26.83	59,349
Not Certified	133.2	72.0	64.9	2.9	39.0	16.42	23.79	51,863
Pediatrics								
Certified	169.4	131.2	81.4	4.0	28.2	12.68	24.34	52,422
Not Certified	164.2	126.0	82.1	3.7	23.0	12.84	21.97	48,159
Surgery								
Certified	146.3	64.3	47.8	4.0	53.9	15.78	32.68	80,772
Not Certified	154.5	81.6	55.5	4.0	62.4	14.42	25.60	59,659
Ob-Gyn.								
Certified	157.4	102.1	70.6	3.5	38.5	18.24	30.84	72,206
Not Certified	137.8	93.4	69.3	4.1	33.7	16.57	24.13	57,213

* Male physicians only

Table 20 (Continued)
Physician Activity and Income Related to Board Certification
(Weighted Means)*

Specialty Group/ Board Certification	Total Patient Contacts	Office Visits	Office Visits/ Total Patient Contact	Office Visits/ Office Hours	Inpatient Hospital Visits	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
	Weekly Rates							
Med-Spec.								
Certified	146.6	104.3	71.1	5.8	30.8	18.67	33.77	71,446
Not Certified	134.1	99.3	77.4	3.6	20.6	16.13	30.08	54,983
Surg-Spec.								
Certified	137.8	93.1	78.2	3.8	28.5	16.80	34.00	71,446
Not Certified	15.5	87.1	75.3	3.2	19.2	115.10	27.54	55,399
Psychiatry								
Certified	48.7	35.3	81.9	1.1	9.3	—	27.98	51,576
Not Certified	54.5	38.7	80./6	1.2	12.7	—	27.61	50,795

Table 21
Physician Activity and Income Related to Medicaid Patient Focus, 1977
(Weighted Means)*

Specialty Group/ % Medicaid	Patient Contact Hours	Total Patient Contacts	Total Office Hours	Total Office Contacts	Office Contacts/ Office Hours	Total Hospital Inpatient Visits	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
	—Weekly Rates—								
General Practice									
Less than 10%	50.3	184.9	32.7	133.4	4.3	33.8	$12.57	$21.90	$ 49,025
10-24%	53.3	191.0	33.3	128.2	4.1	42.2	11.70	21.19	50,925
25-49%	50.2	186.8	30.6	127.5	4.3	39.7	12.97	23.53	57,339
50+	53.1	205.7	34.7	134.8	4.0	40.5	14.93	22.07	48,758
Internal Medicine									
Less than 10%	48.6	129.4	29.5	71.8	2.7	40.9	18.20	3031	56,704
10-24%	50.6	139.4	27.3	73.0	2.8	50.2	16.73	27.99	55,621
25-49%	44.4	135.8	26.4	89.5	3.4	41.0	16.21	28.53	51,952
50+	46.1	164.2	27.8	90.9	3.2	49.8	18.05	31.44	59,958
Pediatrics									
Less than 10%	46.3	161.1	35.4	125.1	3.8	24.5	13.28	24.65	52,183
10-24%	52.6	183.4	37.6	144.7	4.0	28.4	11.90	23.35	52,663
25-49%	49.9	175.4	32.4	123.1	4.1	39.6	11.86	23.13	51,432
50+	42.8	142.6	33.8	124.6	4.6	16.0	12.91	20.08	37,167
Surgery									
Less than 10%	50.9	139.5	19.2	66.9	3.9	54.4	15.71	31.69	78,097
10-24%	52.3	158.1	17.6	69.4	4.1	69.0	14.96	31.61	76,209
25-49%	54.8	160.8	18.9	69.7	4.1	64.5	14.99	26.94	64,005
50+	49.0	156.7	21.4	70.6	3.7	65.0	18.97	29.38	78,516

Table 21 (continued)

Specialty Group/ % Medicaid	Patient Contact Hours	Total Patient Contacts	Total Office Hours	Total Office Contacts	Office Contacts/ Office Hours	Total Hospital Inpatient Visits	Office Follow-up Fee	Net Income/ Patient Hours	Annual Net Income
	Weekly Rates								
Ob-Gyn									
Less than 10%	51.3	149.2	27.3	98.8	4.0	34.4	18.87	30.31	69,280
10-24%	54.9	163.9	29.2	104.4	3.9	44.3	16.37	27.99	65,485
25-49%	56.4	176.8	27.9	112.7	4.3	52.4	15.06	28.53	81,379
50+	—	—	—	—	—	—	—	—	—
Med-Spec									
Less than 10%	43.7	141.6	30.0	101.4	3.7	25.1	18.46	32.55	66,986
10-24%	43.4	143.9	27.6	107.8	3.8	30.9	16.97	34.48	73,289
25-49%	45.3	200.7	27.3	127.7	4.4	64.3	17.58	30.43	62,021
50+	—	—	—	—	—	—	—	—	—
Surg-Spec									
Less than 10%	44.8	130.9	29.0	93.6	3.6	22.3	17.56	33.10	68,040
10-24%	45.7	143.2	25.8	90.1	3.9	36.1	15.29	32.68	70,495
25-49%	46.3	145.2	27.7	109.8	4.1	26.1	17.13	32.41	71,270
50+	—	—	—	—	—	—	—	—	—
Psychiatry									
Less than 10%	40.6	47.7	34.4	36.7	1.1	7.6		27.73	51,170
10-24%	43.5	68.4	31.0	39.5	1.3	25.9		28.06	53,350
25-49%	41.1	65.3	30.7	39.9	1.3	16.5		30.17	56,526
50+	39.4	44.1	28.0	30.4	1.1	12.6		20.67	37,910

Table 12 (Continued)
Multiple Regression Analyses for Physician Activity and Income

Sample Group	R^2	Board	Age	Age^2	Pop	PCINC	MDPOP	MCARE	Group	INCPATHF
Office Follow-up Fee										
Sample 1	.289	1.23 (.302)	.243 (.099)	-.003 (.001)	.0009 (.0001)	.0014 (.0002)	.008 (.001)	.019 (.006)	-.223 (.280)	
Sample 2	.512	.743 (.071)	-.091 (.102)	-.011 (.0010)	.0007 (.0001)	.0013 (.0002)	.007 (.001)	.003 (.007)	.176 (.328)	
Sample 3	.258	-.860 (.771)	.284 (.279)	-.003 (.003)	.001 (.0002)	.0009 (.0005)	.010 (.003)	-.010 (.017)	-.231 (.663)	
Sample 4	.264	2.18 (.634)	.408 (.188)	-.004 (.002)	.0011 (.0002)	.0015 (.0003)	.004 (.002)	.036 (.010)	-.826 (.499)	
Net Income										
Sample 1	.150	7002 (1355)	2988 (443)	-30.7 (4.25)	.607 (.399)	.176 (.786)	-8.72 (5.26)	-6.81 (26.88)	10,212 (1258)	
Sample 2	.127	3421 (1839)	2821 (572)	-28.4 (5.41)	.820 (.530)	-.566 (1.11)	-14.27 (6.90)	-6.88 (39.71)	8199 (1846)	
Sample 3	.145	9264 (3317)	1850 (1199)	-18.6 (11.6)	.112 (.102)	-1.21 (1.98)	-16.30 (14.52)	-1.86 (73.98)	11384 (2856)	
Sample 4	.150	3211 (2587)	3629 (767)	-37.8 (715)	.310 (.664)	.849 (1.23)	-1.50 (8.82)	22.17 (41.53)	9700 (2039)	
Net Income per Hour										
Sample 1	.138	3.72 (.713)	1.34 (.233)	-.013 (.002)	.0006 (.0002)	.0005 (.0004)	.0016 (.0028)	-.018 (.014)	3.94 (.663)	
Sample 2	.088	1.21 (.950)	1.13 (.296)	-.011 (.003)	.0005 (.0003)	.0002 (.0005)	.002 (.004)	-.027 (.021)	3.03 (.954)	
Sample 3	.165	6.33 (1.64)	.880 (.592)	-.007 (.006)	.0006 (.0005)	-.0002 (.001)	-.0014 (.007)	-.024 (.037)	5.24 (1.41)	
Sample 4	.074	1.46 (1.48)	.167 (.439)	-.016 (.004)	.0009 (.0004)	.0004 (.0007)	-.0001 (.005)	-.026 (.023)	3.22 (1.17)	

Sample Group	Surg.	Med-Spec.	Surg-Spec.	IM	OS	NS	Surg-Spec.
Total Patient Visits							
Sample 1	-16.9 (4.88)	-20.3 (4.81)	-16.0 (4.79)				
Sample 2				-29.4 (5.76)			
Sample 3					18.44 (9.20)	-23.17 (10.17)	
Sample 4							7.83 (5.39)
Office Visits per Hour							
Sample 1	-.060 (.106)	-.332 (.104)	-.098 (.104)				
Sample 2				-.89 (.113)			
Sample 3					.424 (.197)	-1.01 (2.18)	
Sample 4							.491 (.127)
Number of Inpatient Hospital Visits							
Sample 1	17.65 (3.07)	-17.08 (2.98)	-13.89 (2.96)				
Sample 2				14.45 (3.12)			
Sample 3					-8.56 (6.46)	8.02 (7.05)	
Sample 4							3.17 (3.59)

Table 12
Multiple Regression Analyses for Physician Activity and Income

Sample Group	R^2	Board	Age	Age^2	Pop	PCINC	MDPOP	MCARE	Group	INCPATHR
Total Patient Visits										
Sample 1	.130		5.04 (1.27)	-.521 (.012)	-.0006 (.001)	-.010 (.002)	.070 (.015)	.002 (.077)	16.72 (3.58)	-.603 (.141)
Sample 2	.216		6.25 (1.76)	-.069 (.017)	.001 (.001)	-.014 (.003)	-.067 (.021)	.212 (.121)	10.47 (5.61)	-.509 (.238)
Sample 3	.105		.903 (3.09)	-.016 (.030)	-.003 (.003)	-.009 (.005)	-.061 (.038)	-.196 (.192)	19.93 (7.54)	.018 (.282)
Sample 4	.063		5.05 (2.19)	-.051 (.021)	-.002 (.002)	-.002 (.003)	-.027 (.025)	.030 (.117)	16.70 (5.69)	-.734 (.228)
Office Visits per Hour										
Sample 1	.082		.080 (.028)	-.0008 (.0003)	.0000 (.0000)	-.0002 (.0000)	-.0011 (.0003)	-.007 (.002)	-.012 (.077)	.015 (.003)
Sample 2	.230		.097 (.035)	-.0010 (.000)	.0000 (.0000)	-.0002 (.0000)	-.0010 (.0004)	-.002 (.002)	-.13 (.110)	.024 (.005)
Sample 3	.137		-.014 (.066)	.0000 (.0006)	-.0000 (.0001)	-.0002 (.0001)	.0001 (.0008)	-.004 (.004)	.095 (.161)	.020 (.006)
Sample 4	.061		.093 (.052)	-.0008 (.0005)	.0000 (.0000)	-.0000 (.0001)	-.0007 (.0006)	-.006 (.0028)	-.055 (.134)	.015 (.005)
Number of Inpatient Hospital Visits										
Sample 1	.154		1.32 (.793)	-.018 (.008)	-.0009 (.0007)	-.002 (.0014)	-.019 (.0094)	.281 (.048)	16.15 (2.22)	
Sample 2	.144		1.30 (.957)	-.016 (.009)	.0002 (.0009)	-.005 (.002)	-.035 (.012)	.273 (.066)	7.16 (3.05)	
Sample 3	.074		1.76 (2.17)	(-.023) (.021)	-.002 (.002)	-.003 (.004)	-.033 (.027)	.081 (.136)	14.03 (5.20)	
Sample 3	.074		1.76 (2.17)	-.023 (.021)	-.002 (.002)	-.003 (.004)	-.033 (.027)	.081 (.136)	14.03 (5.20)	
Sample 4	.152		.025 (1.43)	-.004 (.014)	-.0001 (.0001)	-.0001 (.002)	-.012 (.016)	.358 (.077)	24.76 (3.75)	

Sample Group	Surg.	Med-Spec.	Surg-Spec.	IM	OS	NS	Surg-Spec.
Office Follow-up Fee							
Sample 1	-1.26 (.386)	.824 (.379)	-.034 (.383)				
Sample 2				3.24 (.336)			
Sample 3					1.03 (.821)	5.69 (.887)	
Sample 4							-1.01 (.475)
Net Income							
Sample 1	3823 (1735)	1574 (1700)	5614 (1722)				
Sample 2				4759 (1894)			
Sample 3					7411 (3535)	11463 (3817)	
Sample 4							4668 (1938)
Net Income per Hour							
Sample 1	.747 (.914)	5.16 (.896)	5.31 (.907)				
Sample 2				3.55 (.979)			
Sample 3					3.36 (1.75)	7.67 (1.89)	
Sample 4							.380 (1.11)

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